

# UNIVERSITY OF ESWATINI

## Faculty of Science and Engineering

Department of Computer Science

### RESIT EXAMINATION - SEPTEMBER 2021

Title of Paper: COMPUTER NETWORKS I

Course Number: CSC431

Time Allowed: 3 hours

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#### **Instructions to candidates:**

*This question paper consists of FIVE (5) questions. Answer Question 1 and any other 3 questions of your choice from the 4 remaining questions*

*Marks are indicated in square brackets.*

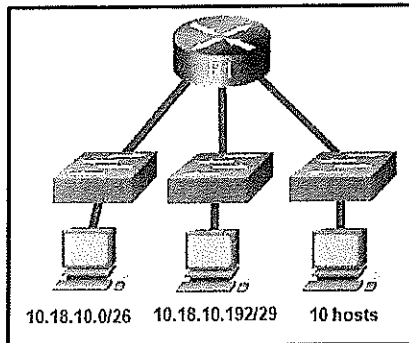
*All questions carry equal marks (25 Marks Each).*

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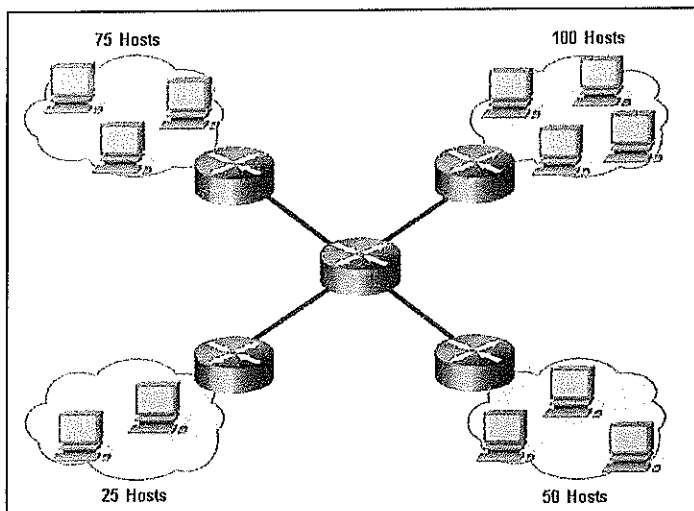
**QUESTION 1 (Compulsory: Multiple choice)**

1. Refer to the exhibit. Which two network addresses can be assigned to the network containing 10 hosts? Your answers should waste the fewest addresses, not reuse addresses that are already assigned, and stay within the 10.18.10.0/24 range of addresses. (Choose two.)



- A. 10.18.10.200/28
- B. 10.18.10.208/28
- C. 10.18.10.240/27
- D. 10.18.10.200/27
- E. 10.18.10.224/27
- F. 10.18.10.224/28

2. Refer to the exhibit. A company uses the address block of 128.107.0.0/16 for its network. What subnet mask would provide the maximum number of equal size subnets while providing enough host addresses for each subnet in the exhibit?



- A. 255.255.255.192

- B. 255.255.255.0
- C. 255.255.255.128
- D. 255.255.255.240
- E. 255.255.255.224

**3. A network administrator wants to have the same subnet mask for three subnetworks at a small site. The site has the following networks and numbers of devices:**

Subnetwork A: IP phones - 10 addresses

Subnetwork B: PCs - 8 addresses

Subnetwork C: Printers - 2 addresses

**What single subnet mask would be appropriate to use for the three subnetworks?**

- A. 255.255.255.0
- B. 255.255.255.240
- C. 255.255.255.248
- D. 255.255.255.252

**4. What two pieces of information are displayed in the output of the show ip interface brief command? (Choose two.)**

- A. IP addresses
- B. interface descriptions
- C. MAC addresses
- D. next-hop addresses
- E. Layer 1 statuses
- F. speed and duplex settings

**5. A user is complaining that an external web page is taking longer than normal to load. The web page does eventually load on the user machine. Which tool should the technician use with administrator privileges in order to locate where the issue is in the network?**

- A. ping
- B. nslookup
- C. tracert
- D. ipconfig /displaydns

**6. A network technician is researching the use of fiber optic cabling in a new technology center. Which two issues should be considered before implementing fiber optic media? (Choose two.)**

- A. Fiber optic cabling requires different termination and splicing expertise from what copper cabling requires.
- B. Fiber optic cabling requires specific grounding to be immune to EMI.
- C. Fiber optic cabling is susceptible to loss of signal due to RFI.

- D. Fiber optic cable is able to withstand rough handling.
- E. Fiber optic provides higher data capacity but is more expensive than copper cabling.

**7. What technique is used with UTP cable to help protect against signal interference from crosstalk?**

- A. wrapping a foil shield around the wire pairs
- B. twisting the wires together into pairs
- C. terminating the cable with special grounded connectors
- D. encasing the cables within a flexible plastic sheath

**8. A network administrator is designing the layout of a new wireless network. Which three areas of concern should be accounted for when building a wireless network? (Choose three.)**

- A. extensive cabling
- B. mobility options
- C. packet collision
- D. interference
- E. security
- F. coverage area

**9. Users report that the network access is slow. After questioning the employees, the network administrator learned that one employee downloaded a third-party scanning program for the printer. What type of malware might be introduced that causes slow performance of the network?**

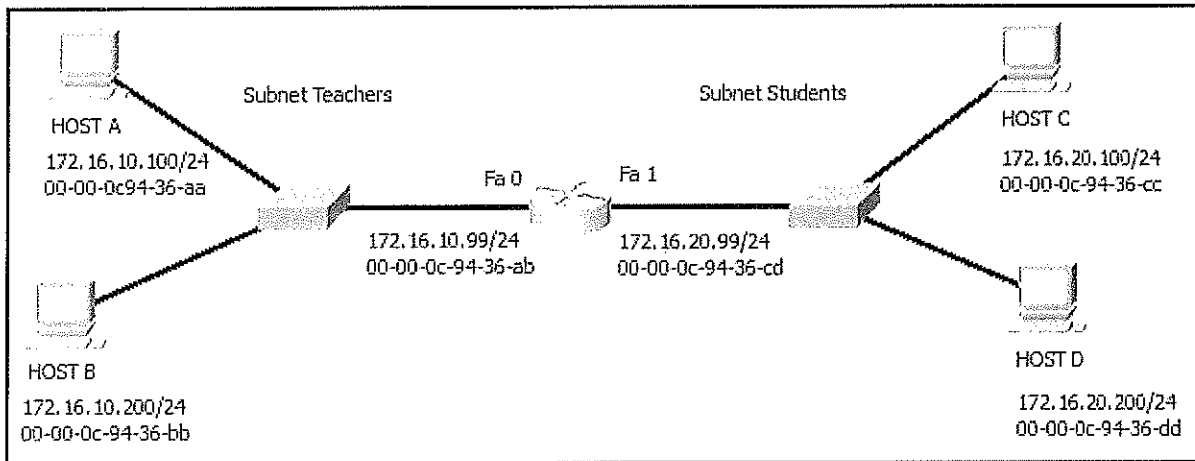
- A. virus
- B. worm
- C. phishing
- D. spam

**10. Which scenario describes a function provided by the transport layer?**

- A. A student is using a classroom VoIP phone to call home. The unique identifier burned into the phone is a transport layer address used to contact another network device on the same network.
- B. A student is playing a short web-based movie with sound. The movie and sound are encoded within the transport layer header.
- C. A student has two web browser windows open in order to access two web sites. The transport layer ensures the correct web page is delivered to the correct browser window.

- D. A corporate worker is accessing a web server located on a corporate network. The transport layer formats the screen so the web page appears properly no matter what device is being used to view the web site.

11. Refer to the exhibit. Host B on subnet Teachers transmits a packet to host D on subnet Students. Which Layer 2 and Layer 3 addresses are contained in the PDUs that are transmitted from host B to the router?



- A. Layer 2 destination address = 00-00-0c-94-36-ab  
 Layer 2 source address = 00-00-0c-94-36-bb  
 Layer 3 destination address = 172.16.20.200  
 Layer 3 source address = 172.16.10.200
- B. Layer 2 destination address = 00-00-0c-94-36-dd  
 Layer 2 source address = 00-00-0c-94-36-bb  
 Layer 3 destination address = 172.16.20.200  
 Layer 3 source address = 172.16.10.200
- C. Layer 2 destination address = 00-00-0c-94-36-cd  
 Layer 2 source address = 00-00-0c-94-36-bb  
 Layer 3 destination address = 172.16.20.99  
 Layer 3 source address = 172.16.10.200
- D. Layer 2 destination address = 00-00-0c-94-36-ab  
 Layer 2 source address = 00-00-0c-94-36-bb  
 Layer 3 destination address = 172.16.20.200  
 Layer 3 source address = 172.16.100.200

12. What does the term “attenuation” mean in data communication?

- A. strengthening of a signal by a networking device

- B. leakage of signals from one cable pair to another
- C. time for a signal to reach its destination
- D. loss of signal strength as distance increases

13. Refer to the exhibit. An administrator is trying to configure the switch but receives the error message that is displayed in the exhibit. What is the problem?

```
Switch1> config t
^
% Invalid input detected at '^' marker.
```

- A. The entire command, configure terminal, must be used.
- B. The administrator is already in global configuration mode.
- C. The administrator must first enter privileged EXEC mode before issuing the command.
- D. The administrator must connect via the console port to access global configuration mode.

14. Which two protocols operate at the top layer of the TCP/IP protocol suite? (Choose two.)

- A. TCP
- B. IP
- C. UDP
- D. POP
- E. DNS
- F. Ethernet

15. A client packet is received by a server. The packet has a destination port number of 110. What service is the client requesting?

- A. DNS
- B. DHCP
- C. SMTP
- D. POP3

16. What command can be used on a Windows PC to see the IP configuration of that computer?

- A. show ip interface brief
- B. ping
- C. show interfaces
- D. ipconfig

17. A wired laser printer is attached to a home computer. That printer has been shared so that other computers on the home network can also use the printer. What networking model is in use?

- A. client-based
- B. master-slave
- C. point-to-point
- D. peer-to-peer (P2P)

**18. What characteristic describes a virus?**

- A. a network device that filters access and traffic coming into a network
- B. the use of stolen credentials to access private data
- C. an attack that slows or crashes a device or network service
- D. malicious software or code running on an end device

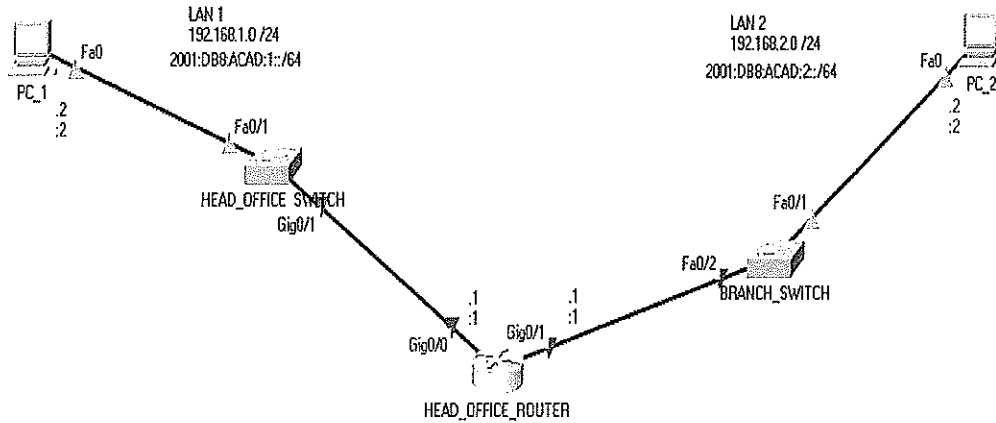
**QUESTION 2**

- A. What is the Network layer? Explain 3 services offered by the Network layer. [6]
- B. What is the difference between routing and forwarding? [3]
- C. Distinguish between static and dynamic routing algorithms. [3]
- D. Into how many classes can an IP address fall into, and how do you determine which class it belongs to? [5]
- E. If a 1500-byte IP datagram needs to traverse a link that has a maximum transmission unit of 750 bytes, describe what will happen to the datagram at the router that is connected to the link if fragmentation is allowed on the datagram. [8]

**QUESTION 3**

- A. Distinguish between static and dynamic routing. Also, why they usually co-exist in most modern networks. Also explain how each can be configured in **packet tracer**. Give an example *network scenario* and state the **commands** that would be used to configure them. [10]
- B. Explain the concept of subnetting. State any 2 benefits of subnetting. [3]

C. Using the network topology below, write a sequence of commands that you will enter for each device (including the prompts). Enter the commands for setting the following; [12]



- Hostnames
- Banner (“Unauthorised Access is strictly prohibited”)
- Privileged EXEC mode password – **ciscoen**
- Console password – **ciscoconsole**
- Telnet password – **ciscotelnet**
- Interface descriptions
- IP addresses (both ipv4 and ipv6)

#### QUESTION 4

- A. What is the role of the transport layer in the 5-layer TCP/IP protocol stack? [3]
- B. Describe the functionality provided by the Transmission Control Protocol (TCP) [3]
- C. Consider the TCP connection mechanism.
- i. What mechanism is used to set up a TCP connection? [1]
  - ii. Why is the mechanism needed? [2]
  - iii. Outline how the mechanism works. [5]
- D. What is flow control and how is it achieved in TCP? [5]
- E. What is end-to-end congestion control and how is it achieved in TCP? [6]



## QUESTION 5

A. Define CIDR. [2]

B. Consider host IP 192.168.128.0 /16 to design a network in a new office building where the following requirements must be supported and met;

- Department 1 (235 hosts)
- Department 2 (920 hosts)
- Department 3 (128 hosts).
- Department 4 (60 hosts)

Calculate the following for each department: [12]

- i. Number of Sub-Net Bits
- ii. Number of Host Bits
- iii. Total Network Bits
- iv. Maximum possible Networks
- v. Maximum Valid Hosts/Network
- vi. Default Gateway

Also write the *Network address*, *Host IP address range* and *Broadcast address* for every department.

C. Consider a subnet with prefix 101.101.101.160/28. Given an example of one IP address (of form xxx.xxx.xxx.xxx) that can be assigned to this network. [3]

D. Suppose an ISP owns the block of addresses of the form 101.101.128/17. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets? [8]

**End of Question Paper**